FACT SHEET FOR NPDES PERMIT WA0037184
PARADISE POINT STATE PARK

SUMMARY

The sewage treatment system at Paradise Point State Park consists of a facultative lagoon that stores waste water during the summer and discharges during the fall and winter to a drainfield that is flooded by the Lewis River. The Department of Ecology (Department) has determined that this constitutes a surface water discharge. The effluent is chlorinated before discharging to the drainfield.

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INTRODUCTION

The Federal Clean Water Act (FCWA, 1972, and later modifications, 1977, 1981, and 1987) established water quality goals for the navigable (surface) waters of the United States. One of the mechanisms for achieving the goals of the Clean Water Act is the National Pollutant Discharge Elimination System (NPDES) of permits, which is administered by the Environmental Protection Agency (EPA). The EPA has delegated responsibility to administer the NPDES permit program to the state of Washington on the basis of Chapter 90.48 Revised Code of Washington (RCW) which defines the Department of Ecology's authority and obligations in administering the wastewater discharge permit program.

The regulations adopted by the state include procedures for issuing permits [Chapter 173-220 Washington Administrative Code (WAC)], technical criteria for discharges from municipal wastewater treatment facilities (Chapter 173-221 WAC), water quality criteria for surface and ground waters (Chapters 173-201A and 200 WAC), and sediment management standards (Chapter 173-204 WAC). These regulations require that a permit be issued before discharge of wastewater to waters of the state is allowed. The regulations also establish the basis for effluent limitations and other requirements which are to be included in the permit. One of the requirements (WAC 173-220-060) for issuing a permit under the NPDES permit program is the preparation of a draft permit and an accompanying fact sheet. Public notice of the availability of the draft permit is required at least thirty days before the permit is issued (WAC 173-220-050). The fact sheet and draft permit are available for review (see Appendix A--Public Involvement of the fact sheet for more detail on the Public Notice procedures).

The fact sheet and draft permit have been reviewed by the Permittee. Errors and omissions identified in this review have been corrected before going to public notice. After the public comment period has closed, the Department will summarize the substantive comments and the response to each comment. The summary and response to comments will become part of the file on the permit and parties submitting comments will receive a copy of the Department's response. The fact sheet will not be revised. Comments and the resultant changes to the permit will be summarized in Appendix D--Response to Comments.

GENERAL INFORMATION	
Applicant	Washington State Parks & Recreation
Facility Name and Address	Paradise Point State Park Rt. 1 Box 33914 Northwest Paradise Road Ridgefield, WA 98642
Type of Treatment:	Facultative lagoon with chlorination
Discharge Location	East Fork of the Lewis River (side bank infiltration) Latitude: 45° 52' 06" N Longitude: 122° 42' 10" W.
Water Body ID Number	1227190458661

BACKGROUND INFORMATION

DESCRIPTION OF THE FACILITY

HISTORY

The Paradise Point State Park lagoon system began operation in August 1971 to replace on-site septic systems. For the first six years of operation the system discharged directly to the River. The lagoon appears to have had some revisions to the system in 1988. The lagoon liner was installed in 1971. The liner designed by BF Goodrich was not intended for sewage and was only intended to last 15 years and has, therefore, exceeded its normal service life by 16 years. The system has never had a discharge permit, but the park has chlorinated the effluent and kept records for the last several years.

COLLECTION SYSTEM STATUS

The collection system is small serving the comfort stations of a state park and the park ranger's residence. The collection system has not been tested for leaks or infiltration. There is no metering on the water supply system and there is no influent metering on the lagoon. An examination of the collection system and an inflow and infiltration report will be required under the new permit. The Park is open seven days per week during the high season and open Friday, Saturday, and Sunday from October 1, through March 31. During the summer months, the facility has 65 campsites open and filled on the weekends and averages 25 to 30 full campsites on the weekdays. The park likely averages from 135 people per day to 260 people per day during peak season.

TREATMENT PROCESSES

The treatment process consists of a single cell lagoon without aeration. Waste is held in the lagoon typically from July through September until autumn rains force the operator to begin discharging. There is no influent meter. The effluent flow from the lagoon is measured with a mechanical flow meter. This type of meter has an impeller that has in the past been plugged with rags and debris and is inappropriate for use in a sewage plant. A small shed houses the flow meter, a composite sampler, and a plastic mixing barrel for mixing and dispensing liquid bleach solution. The effluent then enters a 1,000-gallon concrete tank which is intended to act as a chlorine contact chamber. There is a sampling port in the top of the tank. The effluent then drops steeply down hill to an infiltration line located in wetlands and within the flood plain of the East Fork Lewis River. The permit will require replacement of the effluent flow meter as well as installation of an influent flow meter and influent sampling equipment.

The facility is rated as a Class I facility according to WAC 173-230-140, and therefore, requires an operator of at least Group I certification. The Park Ranger, Morris Shook, has a Group I certification and lives in the ranger's residence on-site. The actual plant does not regularly discharge until the rainy season, and therefore, has not been regularly managed until that time.

The Park is not expected to grow or expand.

DISCHARGE OUTFALL

Paradise Point does not have a traditional outfall. As stated above, the wastewater is discharged to an infiltration trench located in saturated soils that are continuous with the East Fork Lewis River. At the time of a site visit by the Department on June 13, 2002, the area of the infiltration trench was inaccessible due to standing water in the river bank wetlands. The infiltration line is composed of 4-inch PVC located

in a gravel trench approximately two feet below ground surface. Drawings provided by the Permittee show the infiltration line located in the saturated zone below the lowest ground water level during the summer.

The Department has determined that this outfall configuration constitutes a discharge to waters of the state (East Fork Lewis River), and therefore, requires an NPDES permit.

RESIDUAL SOLIDS

At the present time, there is no headworks and no solids removal (grit or screenings). Solids end up in the lagoon. In addition, no rags, scum, or other debris are removed as part of the routine maintenance of the equipment. There is no plan to dispose of the biosolids that have settled to the bottom of the lagoon. The Permittee conducted a "sludge-judge" sampling of the sludge depths in the lagoon. A report on sludge depth was attached to the application dated October 11, 2001. The sludge depths submitted in this report do not appear to be deeper than 1.0 feet and average 0.68 feet. Because the lagoon is only 5.0 feet deep, the 1.0 feet of sludge occupies a significant portion of the lagoon capacity. Sludge in lagoons of this age can solidify below a certain depth. There may be soft sludge on top that is readable with the sludge-judge and old harder material beneath that is not readable. The Permittee will need to develop a plan for sludge removal.

Because the lagoon liner has outlived the expected life by 16 years, the liner is assumed to be leaking and should be replaced. The permit will require engineering plans and specifications for a new lagoon liner and will require liner replacement by a certain date. See Section S9 in the permit.

PERMIT STATUS

No previous permit has been issued for this facility.

An application for permit was submitted to the Department in December of 1996. The application was completed except that influent and effluent data was lacking. The application was never accepted. Another application was issued in October 2001. Parks has been cooperative in providing information as needed during the writing of this permit.

SUMMARY OF COMPLIANCE

Because the facility has never been permitted, it is not possible to check compliance against a permit. However, the facility has sampled its effluent. The facility received its last inspection on June 13, 2002, for the purpose of writing the permit. A more comprehensive compliance inspection was conducted on May 30, 1996.

WASTEWATER CHARACTERIZATION

Minimal discharge information was gathered by the Permittee and reported on Discharge Monitoring Reports (DMRs) over the past several years. Very few samples of BOD, TSS, or fecal coliform were taken over the last three years. However, averages and maximums for these parameters are shown in the table below:

Characterization from DMRs for 1/1999 – 8/2001

Parameter	BOD mg/L	TSS mg/L	Residual Chlorine mg/L	fecal coliform org./100 ml	Flow GPD
Average	11.8	15.2	2	4	3,475

Maximum	40	45	7	10	34,800

Also sampled were pH and dissolved oxygen. The pH readings appear to be within the normal range most of the time. Dissolved Oxygen, however, consistently was above the saturation value of 15 mg/L. Whether this is due to an uncalibrated meter or truly oversaturated water is not clear. The Permittee should recheck equipment calibration regularly as required in the permit in S2.C and S5.G.

The flow from the facility is intermittent with no flow for the summer months of July through August and there are often times when there is no flow for a month or more. Flow ranged from an average of 3,475 gpd to a maximum of 34,800 gpd for the year 2000. Records and correspondence from Parks from June 25, 1986, evaluated the capacity of the lagoon and determined that it was capable of handling flows of up to 113,000 gallons per month. This flow would amount to 3,645 gpd if discharged continuously over a one month period. However, there is no mention or determination of loading capacity or the ability of the system to remove BOD and TSS at these flows. There is no mention whether the system will be capable of disinfecting the wastewater at the maximum flow. The application submitted on October 18, 2001, claimed a design capacity of 43,200 gpd, however, no documentation was provided showing how or where that figure was derived. Therefore, the permit will require an engineering evaluation and report on design capacity for BOD, TSS, and fecal coliform reduction and other parameters.

SEPA COMPLIANCE

No changes or construction have been proposed to the system that would trigger State Environmental Policy Act (SEPA) at this time.

PROPOSED PERMIT LIMITATIONS

Federal and state regulations require that effluent limitations set forth in a NPDES permit must be either technology- or water quality-based. Technology-based limitations for municipal discharges are set by regulation [40 Code of Federal Regulations (CFR) 133, and Chapters 173-220 and 173-221 WAC]. Water quality-based limitations are based upon compliance with the Surface Water Quality Standards (Chapter 173-201A WAC), Ground Water Standards (Chapter 173-200 WAC), Sediment Quality Standards (Chapter 173-204 WAC) or the National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992.) The most stringent of these types of limits must be chosen for each of the parameters of concern. Each of these types of limits is described in more detail below.

The limits in this permit are based in part on information received in the application. The effluent constituents in the application were evaluated on a technology- and water quality-basis. The limits necessary to meet the rules and regulations of the state of Washington were determined and included in this permit. The Department does not develop effluent limits for all pollutants that may be reported on the application as present in the effluent. Some pollutants are not treatable at the concentrations reported, are not controllable at the source, are not listed in regulation, and do not have a reasonable potential to cause a water quality violation**.** Effluent limits are not always developed for pollutants that may be in the discharge but not reported as present in the application. In those circumstances, the permit does not authorize discharge of the non-reported pollutants. Effluent discharge conditions may change from the conditions reported in the permit application. If significant changes occur in any constituent, as described in 40 CFR 122.42(a), the Permittee is required to notify the Department. The Permittee may be in violation of the permit until the permit is modified to reflect additional discharge of pollutants.

DESIGN CRITERIA

In accordance with WAC 173-220-150 (1)(g), flows or waste loadings shall not exceed approved design criteria.

The facility was constructed in 1971 and minimal information on the design capacity of the system is available. As mentioned in the previous section, there is no record available that determines the maximum BOD loading, TSS loading, and the monthly average flow for the maximum month that the facility can handle to achieve 85 percent removal.

An approved engineering evaluation of the design capacity for flow, BOD, TSS, reduction of BOD and TSS, pathogen reduction, and chlorine residual will be a requirement of the new permit.

TECHNOLOGY-BASED EFFLUENT LIMITATIONS

Municipal wastewater treatment plants are a category of discharger for which technology-based effluent limits have been promulgated by federal and state regulations. These effluent limitations are given in the Code of Federal Regulations (CFR) 40 CFR Part 133 (federal) and in Chapter 173-221 WAC (state). These regulations are performance standards that constitute all known available and reasonable methods of prevention, control, and treatment for municipal wastewater.

The following technology-based limits for pH, fecal coliform, BOD_5, and TSS are taken from Chapter 173-221 WAC are:

Table 1: Technology-based Limits.

Parameter	Limit
pH:	shall be within the range of 6 to 9 standard units.
Fecal Coliform Bacteria	Monthly Geometric Mean = 200 organisms/100 ml Weekly Geometric Mean = 400 organisms/100 ml
BOD_5 (concentration)	Average Monthly Limit is the most stringent of the following: - 30 mg/L - may not exceed fifteen percent (15%) of the average influent concentration Average Weekly Limit = 45 mg/L
TSS (concentration)	Average Monthly Limit is the most stringent of the following: - 30 mg/L - may not exceed fifteen percent (15%) of the average influent concentration Average Weekly Limit = 45 mg/L
Chlorine	Average Monthly Limit = 0.5 mg/L Average Weekly Limit = 0.75 mg/L

The technology-based monthly average limitation for chlorine is derived from standard operating practices. The Water Pollution Control Federation's Chlorination of Wastewater (1976) states that a properly designed and maintained wastewater treatment plant can achieve adequate disinfection if a 0.5 mg/liter chlorine residual is maintained after fifteen minutes of contact time. See also Metcalf and Eddy, Wastewater Engineering, Treatment, Disposal and Reuse, Third Edition, 1991. A treatment plant that provides adequate chlorination contact time can meet the 0.5 mg/liter chlorine limit on a monthly average basis. According to WAC 173-221-030(11)(b), the corresponding weekly average is 0.75 mg/liter.

The proposed permit will have a maximum limit of 0.5 mg/L chlorine on a monthly basis and 0.75 mg/L weekly. An additional water quality limit will be imposed over these limits as described later in this fact sheet.

The following technology-based mass limits are based on WAC 173-220-130(3)(b) and 173-221-030(11)(b) and uses the best available figure for design flow at this time.

Monthly effluent mass loadings (lbs/day) were calculated as the maximum monthly design flow (.043 MGD) x Concentration limit (30 mg/L) x 8.34 (conversion factor) = mass limit 11 lbs/day.

The weekly average effluent mass loading is calculated as 1.5 x monthly loading = 16.5 lbs/day.

A unique situation exists at this facility in relation to achieving 85 percent removal of BOD & TSS. Because the facility does not discharge during the season with the highest campground use and does discharge when there is little or no camping, calculating percent removal would not be representative. Therefore, the permit will recommend averaging the percent removal of BOD and TSS over a 12-month period. This "rolling average" will divide the previous 12 months of BOD or TSS influent into the 12 months of effluent to get the average value for that date.

SURFACE WATER QUALITY-BASED EFFLUENT LIMITATIONS

In order to protect existing water quality and preserve the designated beneficial uses of Washington's surface waters, WAC 173-201A-060 states that waste discharge permits shall be conditioned such that the discharge will meet established Surface Water Quality Standards. The Washington State Surface Water Quality Standards (Chapter 173-201A WAC) is a state regulation designed to protect the beneficial uses of the surface waters of the state. Water quality-based effluent limitations may be based on an individual waste load allocation (WLA) or on a WLA developed during a basin-wide total maximum daily loading study (TMDL).

The East Fork Lewis River is listed on the 303(d) list for fecal coliform and temperature exceedances. No TMDL appears to have been conducted at this time.

NUMERICAL CRITERIA FOR THE PROTECTION OF AQUATIC LIFE

"Numerical" water quality criteria are numerical values set forth in the state of Washington's Water Quality Standards for Surface Waters (Chapter 173-201A WAC). They specify the levels of pollutants allowed in a receiving water while remaining protective of aquatic life. Numerical criteria set forth in the Water Quality Standards are used along with chemical and physical data for the wastewater and receiving water to derive the effluent limits in the discharge permit. When surface water quality-based limits are more stringent or potentially more stringent than technology-based limitations, they must be used in a permit.

NUMERICAL CRITERIA FOR THE PROTECTION OF HUMAN HEALTH

The state was issued 91 numeric water quality criteria for the protection of human health by the U.S. EPA (EPA 1992). These criteria are designed to protect humans from cancer and other disease and are primarily applicable to fish and shellfish consumption and drinking water from surface waters.

NARRATIVE CRITERIA

In addition to numerical criteria, "narrative" water quality criteria (WAC 173-201A-030) limit toxic, radioactive, or deleterious material concentrations below those which have the potential to adversely affect characteristic water uses, cause acute or chronic toxicity to biota, impair aesthetic values, or

adversely affect human health. Narrative criteria protect the specific beneficial uses of all fresh (WAC 173-201A-130) and marine (WAC 173-201A-140) waters in the state of Washington.

ANTIDEGRADATION

The state of Washington's Antidegradation Policy requires that discharges into a receiving water shall not further degrade the existing water quality of the water body. In cases where the natural conditions of a receiving water are of lower quality than the criteria assigned, the natural conditions shall constitute the water quality criteria. Similarly, when the natural conditions of a receiving water are of higher quality than the criteria assigned, the natural conditions shall constitute the water quality criteria. More information on the State Antidegradation Policy can be obtained by referring to WAC 173-201A-070.

The Department has reviewed existing records and is unable to determine if ambient water quality is either higher or lower than the designated classification criteria given in Chapter 173-201A WAC; therefore, the Department will use the designated classification criteria for this water body in the proposed permit. The discharges authorized by this proposed permit should not cause a loss of beneficial uses.

CRITICAL CONDITIONS

Surface water quality-based limits are derived for the waterbody's critical condition, which represents the receiving water and waste discharge condition with the highest potential for adverse impact on the aquatic biota, human health, and existing or characteristic water body uses.

MIXING ZONES

The Water Quality Standards allow the Department to authorize mixing zones around a point of discharge in establishing surface water quality-based effluent limits. Both "acute" and "chronic" mixing zones may be authorized for pollutants that can have a toxic effect on the aquatic environment near the point of discharge. The concentration of pollutants at the boundary of these mixing zones may not exceed the numerical criteria for that type of zone. Mixing zones can only be authorized for discharges that are receiving all known, available, and reasonable methods of prevention, control and treatment (AKART) and in accordance with other mixing zone requirements of WAC 173-201A-100.

The National Toxics Rule (EPA, 1992) allows the chronic mixing zone to be used to meet human health criteria.

The applicant’s discharge to the river through an infiltration trench is a unique situation. A very basic modeling of mixing was conducted using RIVPLUME. The discharge was considered a side-bank discharge. The RIVPLUME input parameters and output are shown and discussed in Appendix C. It will be the responsibility of the applicant to have the mixing zone re-modeled by a qualified engineer. The river flow and velocity will need to be field checked during the low flow and compared to the known low flow of the USGS station at Heisson.

DESCRIPTION OF THE RECEIVING WATER

The facility discharges to the East Fork of the Lewis River near the confluence with the Lewis River which is designated as a Class A receiving water in the vicinity of the discharge. There do not appear to be any nearby point source discharges. Significant nearby non-point sources of pollutants may include livestock, forest practices, and failing on-site septic systems. However, it is not known if an evaluation has been conducted in this area. Because it is fairly wild in the vicinity of the Park, it is assumed that the contribution from point and non-point sources is minimal in this area.

Characteristic uses of Class A waters include the following: water supply (domestic, industrial, agricultural); stock watering; fish migration; fish rearing, spawning and harvesting; wildlife habitat; primary contact recreation; sport fishing; boating and aesthetic enjoyment; commerce and navigation.

Water quality of this class shall meet or exceed the requirements for all or substantially all uses.

SURFACE WATER QUALITY CRITERIA

Applicable criteria are defined in Chapter 173-201A WAC for aquatic biota. In addition, U.S. EPA has promulgated human health criteria for toxic pollutants (EPA 1992). Criteria for this discharge are summarized below:

Fecal Coliforms	100 organisms/100 ml maximum geometric mean
Dissolved Oxygen	8 mg/L minimum
Temperature	18 degrees Celsius maximum or incremental increases above background
pH	6.5 to 8.5 standard units
Turbidity	less than 5 NTUs above background
Toxics	No toxics in toxic amounts (see Appendix C for numeric criteria for toxics of concern for this discharge)

CONSIDERATION OF SURFACE WATER QUALITY-BASED LIMITS FOR NUMERIC CRITERIA

Pollutant concentrations in the proposed discharge exceed water quality criteria with technology-based controls which the Department has determined to be AKART. A mixing zone is authorized in accordance with the geometric configuration, flow restriction, and other restrictions for mixing zones in Chapter 173-201A WAC and are defined as follows:

The dilution factors of effluent to receiving water that occur within these zones have been determined at the critical condition by the use of the RIVPLUME model. The dilution factors have been determined to be (from Appendix C):

	Acute	Chronic
Aquatic Life	20	66
Human Health, Carcinogen		66
Human Health, Non-carcinogen		66

These dilution zones, however, only allowed when there is adequate mixing with flowing water. Therefore, no mixing zones are allowed when there is no flowing water of the diffuser.

Pollutants in an effluent may affect the aquatic environment near the point of discharge (near field) or at a considerable distance from the point of discharge (far field). Toxic pollutants, for example, are near-field pollutants--their adverse effects diminish rapidly with mixing in the receiving water. Conversely, a pollutant such as BOD is a far-field pollutant whose adverse effect occurs away from the discharge even after dilution has occurred. Thus, the method of calculating water quality-based effluent limits varies with the point at which the pollutant has its maximum effect.

The derivation of water quality-based limits also takes into account the variability of the pollutant concentrations in both the effluent and the receiving water.

The critical condition for the East Fork Lewis River is the seven day average low river flow with a recurrence interval of 10 years (7Q10). Ambient data at critical conditions in the vicinity of the Paradise Point discharge was taken from the Department's Environmental Assessment program on-line data base. The ambient data site was from the East Fork Lewis River near Dollar Corner: http://www.ecy.wa.gov/apps/watersheds/riv/. Data was available from 1976 through 2001 for a variety of conventional parameters.

Critical Conditions Table

Parameter	Value used
7Q10 low flow	66.45 cfs (see Appendix C)
Velocity	0.81 ft/sec (0.2 and 0.081 ft/sec also examined)
Depth	0.5 feet (2ft and 5ft also examined)
Width	164 feet (taken from USGS topo map)
Roughness (Manning)	n=0.007
Slope	0
Temperature	18.7^{o} C
pH (high)	7.9
Dissolved Oxygen	9.7 mg/L
Total Ammonia-N	0.044 mg/L
Fecal Coliform	95/100 ml (based on the entire period of record)
Turbidity	4 NTU

BOD_5--Under critical conditions there is no predicted violation of the Water Quality Standards for Surface Waters. Therefore, the technology-based effluent limitation for BOD_5 was placed in the permit.

The impact of BOD on the receiving water was modeled using simple mixing of dissolved oxygen, at critical condition and with the technology-based effluent limitation for BOD_5 described under "Technology-Based Effluent Limitations" above. The calculations used to determine dissolved oxygen impacts are shown in Appendix C.

Temperature and pH--The impact of pH and temperature are predicted to not cause a problem. The Permittee holds the waste water during most of the critical season. The waste water lagoon may heat up although it is smaller than most lagoons. The waste is discharged through a 1,000-gallon tank that is located in the ground below old growth trees. The discharge is subsurface which can attenuate temperature. And the first point of discharge is to wetlands ponds that are likely to heat to the same degree at the waste lagoon. All these factors are likely to make the impact minimal. The upstream temperature on the East Fork Lewis River is 18.7^{o}C which is higher than the water quality standard and there is a 303(d) listing for temperature on this river. The pH has been kept within the required range and is not expected to be a problem.

Under critical conditions there is no predicted violation of the Water Quality Standards for Surface Waters. Therefore, the technology-based effluent limitations for pH were placed in the permit and

temperature was not limited. However, to assure that temperature is not a problem, the practice of storing the waste through the summer without discharging should continue to the extent possible.

Fecal coliform--The numbers of fecal coliform were modeled by simple mixing analysis using the technology-based limit of 400 org/100 ml, an ambient value of 95 org./100ml, and a dilution factor of 66.

$FC_{mix} = (FC_{eff} + (DF-1)(FC_{amb}))/DF = 99.6$

Under critical conditions there is no predicted violation of the Water Quality Standards for Surface Waters with the technology-based limit. Therefore, the technology-based effluent limitation for fecal coliform bacteria was placed in the proposed permit.

Toxic Pollutants--Federal regulations (40 CFR 122.44) require NPDES permits to contain effluent limits for toxic chemicals in an effluent whenever there is a reasonable potential for those chemicals to exceed the surface water quality criteria. This process occurs concurrently with the derivation of technology-based effluent limits. Facilities with technology-based effluent limits defined in regulation are not exempted from meeting the Water Quality Standards for Surface Waters or from having surface water quality-based effluent limits.

Because the facility serves a state park with only a couple of comfort stations and very little water distribution, there should be very little toxic metals entering the system from pipes or other sources. The exception would be for chlorine and ammonia which are typically found in disinfected municipal sewage. A reasonable potential analysis (See Appendix C) was conducted on these parameters to determine whether or not effluent limitations would be required in this permit.

The determination of the reasonable potential for ammonia and chlorine to exceed the water quality criteria was evaluated with procedures given in EPA, 1991 (Appendix C) at the critical condition. The critical condition in this case occurs during the summer and fall months. The parameters used in the critical condition modeling are shown above in the critical conditions table.

Valid ambient background data was available for ammonia and the background for chlorine was assumed to be zero. Because the ammonia has not been sampled, it was assumed that the facultative lagoon system provides very little treatment for removing ammonia. A typical medium strength ammonia value of 25 mg/L (Metcalf &Eddy, 1991) was used in the calculations. The ammonia was determined to have a reasonable potential to cause a violation of the Water Quality Standards. Effluent limits were calculated using methods from EPA, 1991 as shown in Appendix C. The new permit will have limits for ammonia and sampling will be required.

The calculation of reasonable potential for chlorine also showed that a potential exists for chlorine to violate the water quality criteria. The problem with the chlorine effluent data was high chlorine (5 to 7 mg/L) reported on several DMRs. These higher chlorine values increased the 95th percentile and made the reasonable potential likely to be triggered. It is possible that these values on the DMR were in error. The new permit will have limits for chlorine and sampling will be required.

WHOLE EFFLUENT TOXICITY

The Water Quality Standards for Surface Waters require that the effluent not cause toxic effects in the receiving waters. Many toxic pollutants cannot be detected by commonly available detection methods. However, toxicity can be measured directly by exposing living organisms to the wastewater in laboratory tests and measuring the response of the organisms. Toxicity tests measure the aggregate toxicity of the whole effluent, and therefore, this approach is called whole effluent toxicity (WET) testing.

Toxicity caused by unidentified pollutants is not expected in the effluent from this discharge as determined by the screening criteria given in Chapter 173-205 WAC. Therefore, no whole effluent toxicity testing is required in this permit. The Department may require effluent toxicity testing in the future if it receives information that toxicity may be present in this effluent.

HUMAN HEALTH

Washington's water quality standards now include 91 numeric health-based criteria that must be considered in NPDES permits. These criteria were promulgated for the state by the U.S. EPA in its National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992).

The Department has determined that the applicant's discharge is unlikely to contain chemicals regulated for human health, based on existing data or knowledge. The discharge will be re-evaluated for impacts to human health at the next permit reissuance.

SEDIMENT QUALITY

The Department has promulgated aquatic sediment standards (Chapter 173-204 WAC) to protect aquatic biota and human health. These standards state that the Department may require Permittees to evaluate the potential for the discharge to cause a violation of applicable standards (WAC 173-204-400).

The Department has determined through a review of the discharger characteristics and effluent characteristics that this discharge has no reasonable potential to violate the Sediment Management Standards.

GROUND WATER QUALITY LIMITATIONS

The Department has promulgated Ground Water Quality Standards (Chapter 173-200 WAC) to protect uses of ground water. Permits issued by the Department shall be conditioned in such a manner so as not to allow violations of those standards (WAC 173-200-100).

This Permittee has no discharge to ground and therefore no limitations are required based on potential effects to ground water.

MONITORING REQUIREMENTS

Monitoring, recording, and reporting are required (WAC 173-220-210 and 40 CFR 122.41) to verify that the treatment process is functioning correctly and the effluent limitations are being achieved.

Monitoring for BOD, TSS, (influent and percent removal), and ammonia are being required to further characterize the effluent. These pollutants could have a significant impact on the quality of the surface water.

Monitoring of sludge quantity and quality is necessary to determine the appropriate management options for the sludge. Sludge monitoring is required by the current state and local solid waste management program and also by EPA under 40 CFR 503.

The monitoring schedule is detailed in the proposed permit under Condition S.2. Specified monitoring frequencies take into account the quantity and variability of discharge, the treatment method, past compliance, significance of pollutants, and cost of monitoring. The required monitoring frequency is consistent with agency guidance given in the current version of the Department's *Permit Writer's Manual* (July 1994) for a small lagoon less than 0.5 mgd.

Additional monitoring is required in order to further characterize the effluent. These monitored pollutants could have a significant impact on the quality of the surface water.

LAB ACCREDITATION

With the exception of certain parameters the permit requires all monitoring data to be prepared by a laboratory registered or accredited under the provisions of Chapter 173-50 WAC, *Accreditation of Environmental Laboratories.* The Permittee is required to use an accredited lab or to apply for accreditation.

OTHER PERMIT CONDITIONS

REPORTING AND RECORDKEEPING

The conditions of S3 are based on the authority to specify any appropriate reporting and recordkeeping requirements to prevent and control waste discharges (WAC 173-220-210).

PREVENTION OF FACILITY OVERLOADING

Overloading of the treatment plant is a violation of the terms and conditions of the permit. To prevent this from occurring, RCW 90.48.110 and WAC 173-220-150 require the Permittee to take the actions detailed in proposed permit requirement S.4 to plan expansions or modifications before existing capacity is reached and to report and correct conditions that could result in new or increased discharges of pollutants. Condition S.4 restricts the amount of flow.

OPERATION AND MAINTENANCE (O&M)

The proposed permit contains Condition S.5 as authorized under RCW 90.48.110, WAC 173-220-150, Chapter 173-230 WAC, and WAC 173-240-080. It is included to ensure proper operation and regular maintenance of equipment, and to ensure that adequate safeguards are taken so that constructed facilities are used to their optimum potential in terms of pollutant capture and treatment.

RESIDUAL SOLIDS HANDLING

To prevent water quality problems the Permittee is required in permit Condition S7 to store and handle all residual solids (grit, screenings, scum, sludge, and other solid waste) in accordance with the requirements of RCW 90.48.080, State Water Quality Standards WAC 173-201A, and Biosolids Handling regulations covered under WAC 173-308.

The final use and disposal of sewage sludge from this facility is regulated by U.S. EPA under 40 CFR 503. The disposal of other solid waste is under the jurisdiction of the Clark County Health Department. A plan and schedule for removing the biosolids (sludge) from the lagoon will be required in the new permit in S7. A Biosolids Permit is required and must be received prior to removal of any biosolids.

EFFLUENT MIXING STUDY

The Department has estimated the amount of mixing of the discharge within the authorized mixing zone to determine the potential for violations of the Water Quality Standards for Surface Waters (Chapter 173-201A WAC). Condition S.8 of this permit requires the Permittee to more accurately determine the mixing characteristics of the discharge. Mixing will be measured or modeled under conditions specified in the permit to assess whether assumptions made about dilution will protect the receiving water quality outside the allotted dilution zone boundary.

GENERAL CONDITIONS

General Conditions are based directly on state and federal law and regulations and have been standardized for all individual municipal NPDES permits issued by the Department.

PERMIT ISSUANCE PROCEDURES

PERMIT MODIFICATIONS

The Department may modify this permit to impose numerical limitations, if necessary to meet Water Quality Standards, Sediment Quality Standards, or Ground Water Standards, based on new information obtained from sources such as inspections, effluent monitoring, outfall studies, and effluent mixing studies.

The Department may also modify this permit as a result of new or amended state or federal regulations.

RECOMMENDATION FOR PERMIT ISSUANCE

This proposed permit meets all statutory requirements for authorizing a wastewater discharge, including those limitations and conditions believed necessary to protect human health, aquatic life, and the beneficial uses of waters of the state of Washington. The Department proposes that this permit be issued for five years.

REFERENCES FOR TEXT AND APPENDICES

Environmental Protection Agency (EPA)

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1985. Water Quality Assessment: A Screening Procedure for Toxic and Conventional Pollutants in Surface and Ground Water. EPA/600/6-85/002a.

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1991. Wastewater Engineering, Treatment, Disposal, and Reuse. Third Edition.

Tsivoglou, E.C., and J.R. Wallace.

1972. Characterization of Stream Reaeration Capacity. EPA-R3-72-012. (Cited in EPA 1985 op.cit.)

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Williams, J.R., H.E. Pearson.

1885. Streamflow Statistics and Drainage-Basin Characteristics for the Southwestern and Easter Regions, Washington. Volume 1. U.S.G.S. Open-File Report 84-145-A.

Wright, R.M., and A.J. McDonnell.

1979. In-stream Deoxygenation Rate Prediction. Journal Environmental Engineering Division, ASCE. 105(EE2). (Cited in EPA 1985 op.cit.)

APPENDIX A--PUBLIC INVOLVEMENT INFORMATION

The Department has tentatively determined to issue a permit to the applicant listed on page 1 of this fact sheet. The permit contains conditions and effluent limitations which are described in the rest of this fact sheet.

Public notice of application was published on August 29, 2002, and September 5, 2002, in the *Columbian* to inform the public that an application had been submitted and to invite comment on the issuance of this permit.

The Department will publish a Public Notice of Draft (PNOD) on October 18, 2002, in the *Columbian* to inform the public that a draft permit and fact sheet are available for review. Interested persons are invited to submit written comments regarding the draft permit. The draft permit, fact sheet, and related documents are available for inspection and copying between the hours of 8:00 a.m. and 5:00 p.m. weekdays, by appointment, at the regional office listed below. Written comments should be mailed to:

Water Quality Permit Administrator
Department of Ecology
Southwest Regional Office
P.O. Box 47775
Olympia, WA 98504-7775.

Any interested party may comment on the draft permit or request a public hearing on this draft permit within the 30-day comment period to the address above. The request for a hearing shall indicate the interest of the party and the reasons why the hearing is warranted. The Department will hold a hearing if it determines there is a significant public interest in the draft permit (WAC 173-220-090). Public notice regarding any hearing will be circulated at least 30 days in advance of the hearing. People expressing an interest in this permit will be mailed an individual notice of hearing (WAC 173-220-100).

Comments should reference specific text followed by proposed modification or concern when possible. Comments may address technical issues, accuracy and completeness of information, the scope of the facility's proposed coverage, adequacy of environmental protection, permit conditions, or any other concern that would result from issuance of this permit.

The Department will consider all comments received within 30 days from the date of public notice of draft indicated above, in formulating a final determination to issue, revise, or deny the permit. The Department's response to all significant comments is available upon request and will be mailed directly to people expressing an interest in this permit.

Further information may be obtained from the Department by telephone, (360) 407-6554, or by writing to the address listed above.

This permit and fact sheet were written by Eric Schlorff.

APPENDIX B--GLOSSARY

Acute Toxicity--The lethal effect of a pollutant on an organism that occurs within a short period of time, usually 48 to 96 hours.

AKART-- An acronym for "all known, available, and reasonable methods of prevention, control, and treatment".

Ambient Water Quality--The existing environmental condition of the water in a receiving water body.

Ammonia--Ammonia is produced by the breakdown of nitrogenous materials in wastewater. Ammonia is toxic to aquatic organisms, exerts an oxygen demand, and contributes to eutrophication. It also increases the amount of chlorine needed to disinfect wastewater.

Average Monthly Discharge Limitation --The highest allowable average of daily discharges over a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month (except in the case of fecal coliform). The daily discharge is calculated as the average measurement of the pollutant over the day.

Average Weekly Discharge Limitation -- The highest allowable average of daily discharges over a calendar week, calculated as the sum of all daily discharges measured during a calendar week divided by the number of daily discharges measured during that week. The daily discharge is calculated as the average measurement of the pollutant over the day.

Best Management Practices (BMPs)--Schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the State. BMPs include treatment systems, operating procedures, and practices to control: plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. BMPs may be further categorized as operational, source control, erosion and sediment control, and treatment BMPs.

BOD_5--Determining the Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of organic material present in an effluent that is utilized by bacteria. The BOD_5 is used in modeling to measure the reduction of dissolved oxygen in a receiving water after effluent is discharged. Stress caused by reduced dissolved oxygen levels makes organisms less competitive and less able to sustain their species in the aquatic environment. Although BOD is not a specific compound, it is defined as a conventional pollutant under the federal Clean Water Act.

Bypass--The intentional diversion of waste streams from any portion of a treatment facility.

CBOD5 – The quantity of oxygen utilized by a mixed population of microorganisms acting on the nutrients in the sample in an aerobic oxidation for five days at a controlled temperature of 20 degrees Celsius, with an inhibitory agent added to prevent the oxidation of nitrogen compounds. The method for determining CBOD5 is given in 40 CFR Part 136.

Chlorine--Chlorine is used to disinfect wastewaters of pathogens harmful to human health. It is also extremely toxic to aquatic life.

Chronic Toxicity--The effect of a pollutant on an organism over a relatively long time, often 1/10 of an organism's lifespan or more. Chronic toxicity can measure survival, reproduction or growth rates, or other parameters to measure the toxic effects of a compound or combination of compounds.

Clean Water Act (CWA)--The Federal Water Pollution Control Act enacted by Public Law 92-500, as amended by Public Laws 95-217, 95-576, 96-483, 97-117; USC 1251 et seq.

Combined Sewer Overflow (CSO)--The event during which excess combined sewage flow caused by inflow is discharged from a combined sewer, rather than conveyed to the sewage treatment plant because either the capacity of the treatment plant or the combined sewer is exceeded.

Compliance Inspection - Without Sampling--A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations.

Compliance Inspection - With Sampling--A site visit to accomplish the purpose of a Compliance Inspection - Without Sampling and as a minimum, sampling and analysis for all parameters with limits in the permit to ascertain compliance with those limits; and, for municipal facilities, sampling of influent to ascertain compliance with the percent removal requirement. Additional sampling may be conducted.

Composite Sample--A mixture of grab samples collected at the same sampling point at different times, formed either by continuous sampling or by mixing a minimum of four discrete samples. May be "time-composite"(collected at constant time intervals) or "flow-proportional" (collected either as a constant sample volume at time intervals proportional to stream flow, or collected by increasing the volume of each aliquot as the flow increased while maintaining a constant time interval between the aliquots.

Construction Activity--Clearing, grading, excavation and any other activity which disturbs the surface of the land. Such activities may include road building, construction of residential houses, office buildings, or industrial buildings, and demolition activity.

Continuous Monitoring –Uninterrupted, unless otherwise noted in the permit.

Critical Condition--The time during which the combination of receiving water and waste discharge conditions have the highest potential for causing toxicity in the receiving water environment. This situation usually occurs when the flow within a water body is low, thus, its ability to dilute effluent is reduced.

Dilution Factor--A measure of the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. Expressed as the inverse of the effluent fraction e.g., a dilution factor of 10 means the effluent comprises 10% by volume and the receiving water 90%.

Engineering Report--A document which thoroughly examines the engineering and administrative aspects of a particular domestic or industrial wastewater facility. The report shall contain the appropriate information required in WAC 173-240-060 or 173-240-130.

Fecal Coliform Bacteria--Fecal coliform bacteria are used as indicators of pathogenic bacteria in the effluent that are harmful to humans. Pathogenic bacteria in wastewater discharges are controlled by disinfecting the wastewater. The presence of high numbers of fecal coliform bacteria in a water body can indicate the recent release of untreated wastewater and/or the presence of animal feces.

Grab Sample--A single sample or measurement taken at a specific time or over as short period of time as is feasible.

Industrial User-- A discharger of wastewater to the sanitary sewer which is not sanitary wastewater or is not equivalent to sanitary wastewater in character.

Industrial Wastewater--Water or liquid-carried waste from industrial or commercial processes, as distinct from domestic wastewater. These wastes may result from any process or activity of industry, manufacture, trade or business, from the development of any natural resource, or from animal operations such as feed lots, poultry houses, or dairies. The term includes contaminated storm water and, also, leachate from solid waste facilities.

Infiltration and Inflow (I/I)--"Infiltration" means the addition of ground water into a sewer through joints, the sewer pipe material, cracks, and other defects. "Inflow" means the addition of precipitation-caused drainage from roof drains, yard drains, basement drains, street catch basins, etc., into a sewer.

Interference -- A discharge which, alone or in conjunction with a discharge or discharges from other sources, both:

Inhibits or disrupts the publicly owned treatment works (POTW), its treatment processes or operations, or its sludge processes, use or disposal and;

Therefore is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation) or of the prevention of sewage sludge use or disposal in compliance with the following statutory provisions and regulations or permits issued there under (or more stringent State or local regulations): Section 405 of the Clean Water Act, the Solid Waste Disposal Act (SWDA) (including title II, more commonly referred to as the Resource Conservation and Recovery Act (RCRA), and including State regulations contained in any State sludge management plan prepared pursuant to subtitle D of the SWDA), sludge regulations appearing in 40 CFR Part 507, the Clean Air Act, the Toxic Substances Control Act, and the Marine Protection, Research and Sanctuaries Act.

Major Facility--A facility discharging to surface water with an EPA rating score of > 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Maximum Daily Discharge Limitation--The highest allowable daily discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. The daily discharge is calculated as the average measurement of the pollutant over the day.

Method Detection Level (MDL)--The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is above zero and is determined from analysis of a sample in a given matrix containing the analyte.

Minor Facility--A facility discharging to surface water with an EPA rating score of < 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Mixing Zone--A volume that surrounds an effluent discharge within which water quality criteria may be exceeded. The area of the authorized mixing zone is specified in a facility's permit and follows procedures outlined in State regulations (Chapter 173-201A WAC).

National Pollutant Discharge Elimination System (NPDES)--The NPDES (Section 402 of the Clean Water Act) is the Federal wastewater permitting system for discharges to navigable waters of the United States. Many states, including the State of Washington, have been delegated the authority to issue these permits. NPDES permits issued by Washington State permit writers are joint NPDES/State permits issued under both State and Federal laws.

Pass through -- A discharge which exits the POTW into waters of the State in quantities or concentrations which, alone or in conjunction with a discharge or discharges from other sources, is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation), or which is a cause of a violation of State water quality standards.

pH--The pH of a liquid measures its acidity or alkalinity. A pH of 7 is defined as neutral, and large variations above or below this value are considered harmful to most aquatic life.

Potential Significant Industrial User--A potential significant industrial user is defined as an Industrial User which does not meet the criteria for a Significant Industrial User, but which discharges wastewater meeting one or more of the following criteria:

a. Exceeds 0.5 % of treatment plant design capacity criteria and discharges <25,000 gallons per day or;

b. Is a member of a group of similar industrial users which, taken together, have the potential to cause pass through or interference at the POTW (e.g. facilities which develop photographic film or paper, and car washes).

The Department may determine that a discharger initially classified as a potential significant industrial user should be managed as a significant industrial user.

Quantitation Level (QL)-- A calculated value five times the MDL (method detection level).

Significant Industrial User (SIU)--

1) All industrial users subject to Categorical Pretreatment Standards under 40 CFR 403.6 and 40 CFR Chapter I, Subchapter N and;

2) Any other industrial user that: discharges an average of 25,000 gallons per day or more of process wastewater to the POTW (excluding sanitary, noncontact cooling, and boiler blow-down wastewater); contributes a process wastestream that makes up 5 percent or more of the average dry weather hydraulic or organic capacity of the POTW treatment plant; or is designated as such by the Control Authority* on the basis that the industrial user has a reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement (in accordance with 40 CFR 403.8(f)(6)).

Upon finding that the industrial user meeting the criteria in paragraph 2, above, has no reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement, the Control Authority* may at any time, on its own initiative or in response to a petition received from an industrial user or POTW, and in accordance with 40 CFR 403.8(f)(6), determine that such industrial user is not a significant industrial user.

*The term "Control Authority" refers to the Washington State Department of Ecology in the case of non-delegated POTWs or to the POTW in the case of delegated POTWs.

State Waters--Lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, wetlands, and all other surface waters and watercourses within the jurisdiction of the state of Washington.

Stormwater--That portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes, and other features of a storm water drainage system into a defined surface water body, or a constructed infiltration facility.

Technology-based Effluent Limit--A permit limit that is based on the ability of a treatment method to reduce the pollutant.

Total Suspended Solids (TSS)--Total suspended solids are the particulate materials in an effluent. Large quantities of TSS discharged to a receiving water may result in solids accumulation. Apart from any toxic effects attributable to substances leached out by water, suspended solids may kill fish, shellfish, and other aquatic organisms by causing abrasive injuries and by clogging the gills and respiratory passages of various aquatic fauna. Indirectly, suspended solids can screen out light and can promote and maintain the development of noxious conditions through oxygen depletion.

Upset--An exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, lack of preventative maintenance, or careless or improper operation.

Water Quality-based Effluent Limit--A limit on the concentration or mass of an effluent parameter that is intended to prevent the concentration of that parameter from exceeding its water quality criterion after it is discharged into a receiving water.

APPENDIX C--TECHNICAL CALCULATIONS

Several of the Excel® spreadsheet tools used to evaluate a discharger's ability to meet Washington State water quality standards can be found on the Department's homepage at http://www.ecy.wa.gov.

Stream velocity in the table below was calculated based on several assumptions. A river flow was estimated based on watershed area and flow at Heisson upstream using the following equation: $7Q10_{PP}=7Q10_{H}(A_{PP}/A_{H})$. The seven-day ten-year low flow event at Heisson ($7Q10_{H}$) was available from USGS data based on Pearson III probabilities for a period of record from 1931-1979 (Williams, 1985). The flow was 38.5 cfs.

The area of the East Fork Lewis River Basins were calculated using Arc-View data base files for the basins with the help of Jack Janish of the Environmental Assessment Program. The area of the basin above Heisson (A_H) is $362x10^6$ m^2 and the area above Paradise Point (A_{PP}) is 563 $x10^6$ m^2. The $7Q10_{PP}$ for Paradise Point, based on the ratio of these two basin areas, was 66.45 cfs.

The equation assumes the basin receives equivalent or no rainfall over the entire basin during the low flow period. Another assumption is velocity in the river based on the average width of 164 ft and an average depth of 0.5 ft. Greater average river depths were examined at 2.0 ft and 5.0 ft. These greater depths resulted in greater dilution and were not used.

Spread of a plume from a point source in a river with boundary effects from the shoreline

based on the method of Fischer *et al.* (1979) with correction for the effective origin of effluent.

Revised 22-Feb-96

INPUT		
1. Effluent Discharge Rate (cfs):	0.07	0.07
2. Receiving Water Characteristics Downstream From Waste Input		
Stream Depth (ft):	0.50	0.50
Stream Velocity (fps):	0.81	0.81
Channel Width (ft):	164.00	164.00
Stream Slope (ft/ft) or Manning roughness "n":	0.007	0.007
0 if slope or 1 if Manning "n" in previous cell:	0	0
3. Discharge Distance From Nearest Shoreline (ft):	0	0
4. Location of Point of Interest to Estimate Dilution		
Distance Downstream to Point of Interest (ft):	300	30
Distance From Nearest Shoreline (ft):	0	0

5. Transverse Mixing Coefficient Constant (usually 0.6):	0.6	0.6
6. Original Fischer Method (enter 0) or *Effective Origin* Modification (enter 1)	0	0

OUTPUT

	Chronic	Acute
1. Source Conservative Mass Input Rate		
Concentration of Conservative Substance (%):	100.00	100.00
Source Conservative Mass Input Rate (cfs*%):	6.68	7.00
2. Shear Velocity		
Shear Velocity based on slope (ft/sec):	0.336	0.336
Shear Velocity based on Manning "n":		
using Prasuhn equations 8-26 and 8-54 assuming hydraulic radius equals depth for wide channel		
Darcy-Weisbach friction factor "f":	#N/A	#N/A
Shear Velocity from Darcy-Weisbach "f" (ft/sec):	#N/A	#N/A
Selected Shear Velocity for next step (ft/sec):	0.336	0.336
3. Transverse Mixing Coefficient (ft2/sec):	0.101	0.101
4. Plume Characteristics Accounting for Shoreline Effect (Fischer *et al.*, 1979)		
Co	1.01E-01	1.05E-01
x'	1.39E-03	1.39E-04
y'o	0.00E+00	0.00E+00
y' at point of interest	0.00E+00	0.00E+00
Solution using superposition equation (Fischer eqn 5.9)		
Term for n= -2	0.00E+00	0.00E+00
Term for n= -1	0.00E+00	0.00E+00
Term for n= 0	2.00E+00	2.00E+00
Term for n= 1	0.00E+00	0.00E+00
Term for n= 2	0.00E+00	0.00E+00
Upstream Distance from Outfall to *Effective Origin* of Effluent Source (ft)	#N/A	#N/A
Effective Distance Downstream from Effluent to Point of Interest (ft)	300.00	30.00
x' Adjusted for *Effective Origin*	1.39E-03	1.39E-04
C/Co (dimensionless)	1.51E+01	4.79E+01
Concentration at Point of Interest (Fischer Eqn 5.9)	1.52E+00	5.05E+00
Unbounded Plume Width at Point of Interest (ft)	34.549	10.925
Unbounded Plume half-width (ft)	17.274	5.463
Distance from near shore to discharge point (ft)	0.00	0.00
Distance from far shore to discharge point (ft)	164.00	164.00

Plume width bounded by shoreline (ft)	17.27	5.46
Approximate Downstream Distance to Complete Mix (ft):	86,527	86,527
Theoretical Dilution Factor at Complete Mix:	994.311	948.857
Calculated Flux-Average Dilution Factor Across Entire Plume Width:	104.733	31.605
Calculated Dilution Factor at Point of Interest:	65.632	19.806

Dissolved oxygen concentration following initial dilution.

References: EPA/600/6-85/002b and EPA/430/9-82-011

Based on Lotus File IDOD2.WK1 Revised 19-Oct-93

INPUT

1. Dilution Factor at Mixing Zone Boundary:	66
2. Ambient Dissolved Oxygen Concentration (mg/L):	9.7
3. Effluent Dissolved Oxygen Concentration (mg/L):	2
4. Effluent Immediate Dissolved Oxygen Demand (mg/L):	0

OUTPUT

Dissolved Oxygen at Mixing Zone Boundary (mg/L):	9.58

Calculation Of Ammonia Concentration and Criteria for fresh water. Based on EPA Quality Criteria for Water (EPA 400/5-86-001) and WAC 173-201A. Revised 1-5-94 (corrected total ammonia criterion). Revised 3/10/95 to calculate chronic criteria in accordance with EPA Memorandum from Heber to WQ Stds Coordinators dated July 30, 1992.

INPUT	
1. Ambient Temperature (deg C; 0<T<30)	18.7
2. Ambient pH (6.5<pH<9.0)	7.90
3. Acute TCAP (Salmonids present- 20; absent- 25)	20
4. Chronic TCAP (Salmonids present- 15; absent- 20)	15

OUTPUT

1. Intermediate Calculations:

Acute FT	1.09
Chronic FT	1.41
FPH	1.05
RATIO	14
pKa	9.44
Fraction Of Total Ammonia Present As Un-ionized	2.7880 %

2. Un-ionized Ammonia Criteria

Acute (1-hour) Un-ionized Ammonia Criterion (ug NH3/L)	225.7
Chronic (4-day) Un-ionized Ammonia Criterion (ug NH3/L)	39.8

3. Total Ammonia Criteria:

Acute Total Ammonia Criterion (mg NH3+ NH4/L)	8.1
Chronic Total Ammonia Criterion (mg NH3+ NH4/L)	1.4

4. Total Ammonia Criteria expressed as Nitrogen:

Acute Ammonia Criterion as mg N	6.7
Chronic Ammonia Criterion as N	1.17

REASONABLE POTENTIAL DETERMINATION

				State Water Quality Standard	Max concentration at edge of...			
Parameter	Metal Criteria Translator as decimal Acute	Metal Criteria Translator as decimal Chronic	Ambient Concentration (metals as dissolved) *ug/L*	Acute *ug/L*	Chronic *ug/L*	Acute Mixing Zone *ug/L*	Chronic Mixing Zone *ug/L*	**LIMIT REQ'D ?**
Ammonia	0.95	0.95	44.0000	6700.0000	1170.0000	7402.22	2273.76	YES
Chlorine	0.95	0.95		19.0000	11.0000	264.47	80.14	**YES**

CALCULATIONS FOR REASONABLE POTENTIAL

Effluent percentile value	*Pn*	Max effluent conc. measured (metals as total recoverable) *ug/L*	Coeff Variation *CV*	*s*	# of samples *n*	Multiplier	Acute Dil'n Factor	Chronic Dil'n Factor
0.95	0.050	25000.00	0.60	0.55	1	6.20	20	66
0.95	0.977	6765.00	0.60	0.55	129	0.82	20	66

COMMENTS

Ammonia in the effluent was never measured. A value of 25mg/L is a typical medium concentration for influent waste water that and assuming that it receives very little or no treatment provided by this type of facultative lagoon system. (Metcalf and Eddy, 1991)

Chlorine measurements show several values 5 to 7 mg/l range. These values may have been entered in error. However, these values shifted the 95th percentile much higher and were used in evaluating the reasonable potential

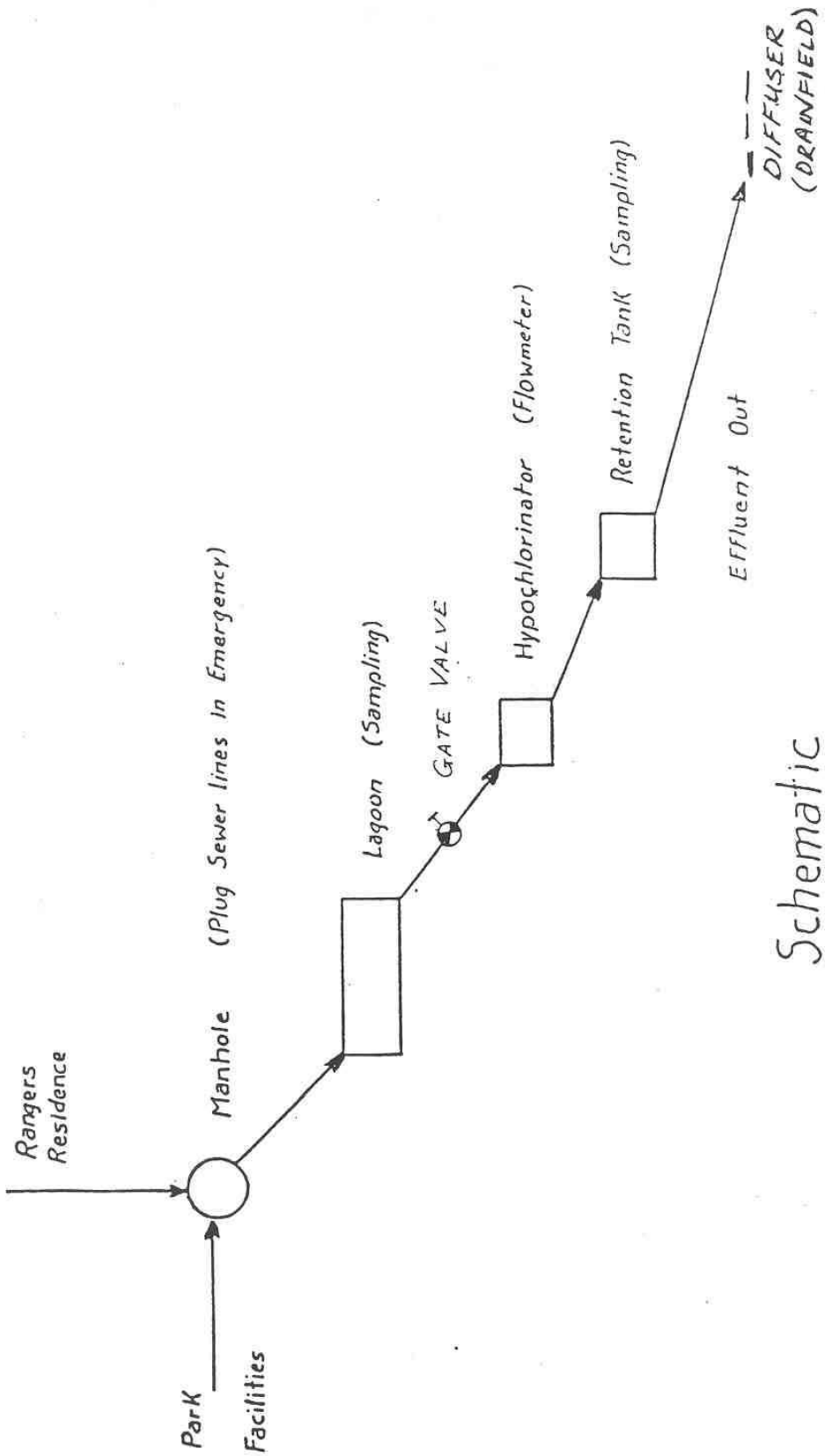
Permit Limit Calculation Summary

	Acute Dil'n Factor	Chronic Dil'n Factor	Metal Criteria Translator	Metal Criteria Translator	Ambient Concentration	Water Quality Standard Acute	Water Quality Standard Chronic	Average Monthly Limit (AML)	Maximum Daily Limit (MDL)
Parameter			Acute	Chronic	*ug/L*	*ug/L*	*ug/L*	ug/L	ug/L
Ammonia	20.0	66.00			44.0000	6700.0000	1170.0000	**60886.0**	**122148.9**
Chlorine	20.00	66.00				19.00	11.00	**189.4**	**380.0**

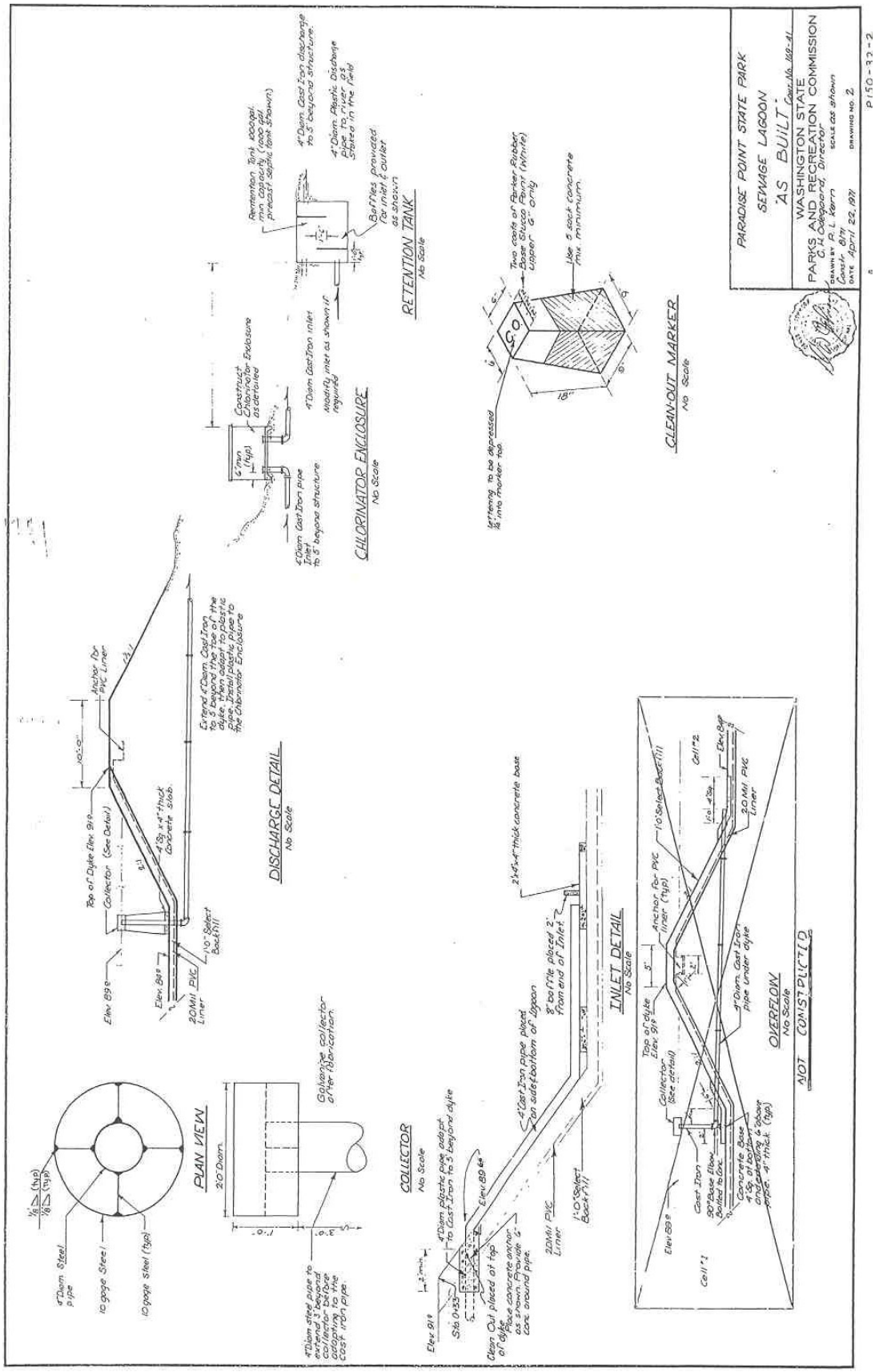
Waste Load Allocation (WLA) and Long Term Average (LTA) Calculations

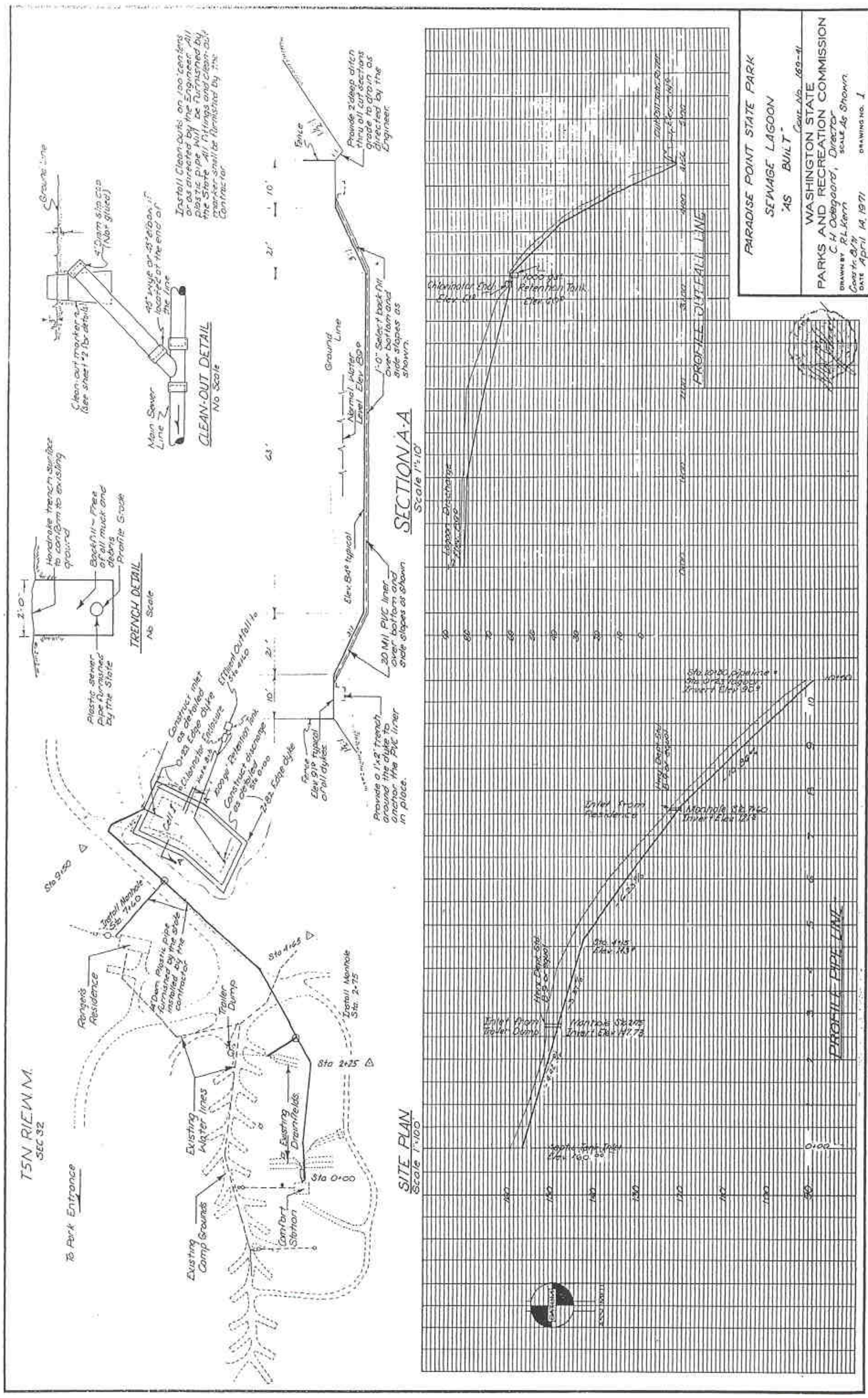
Statistical variables for permit limit calculation

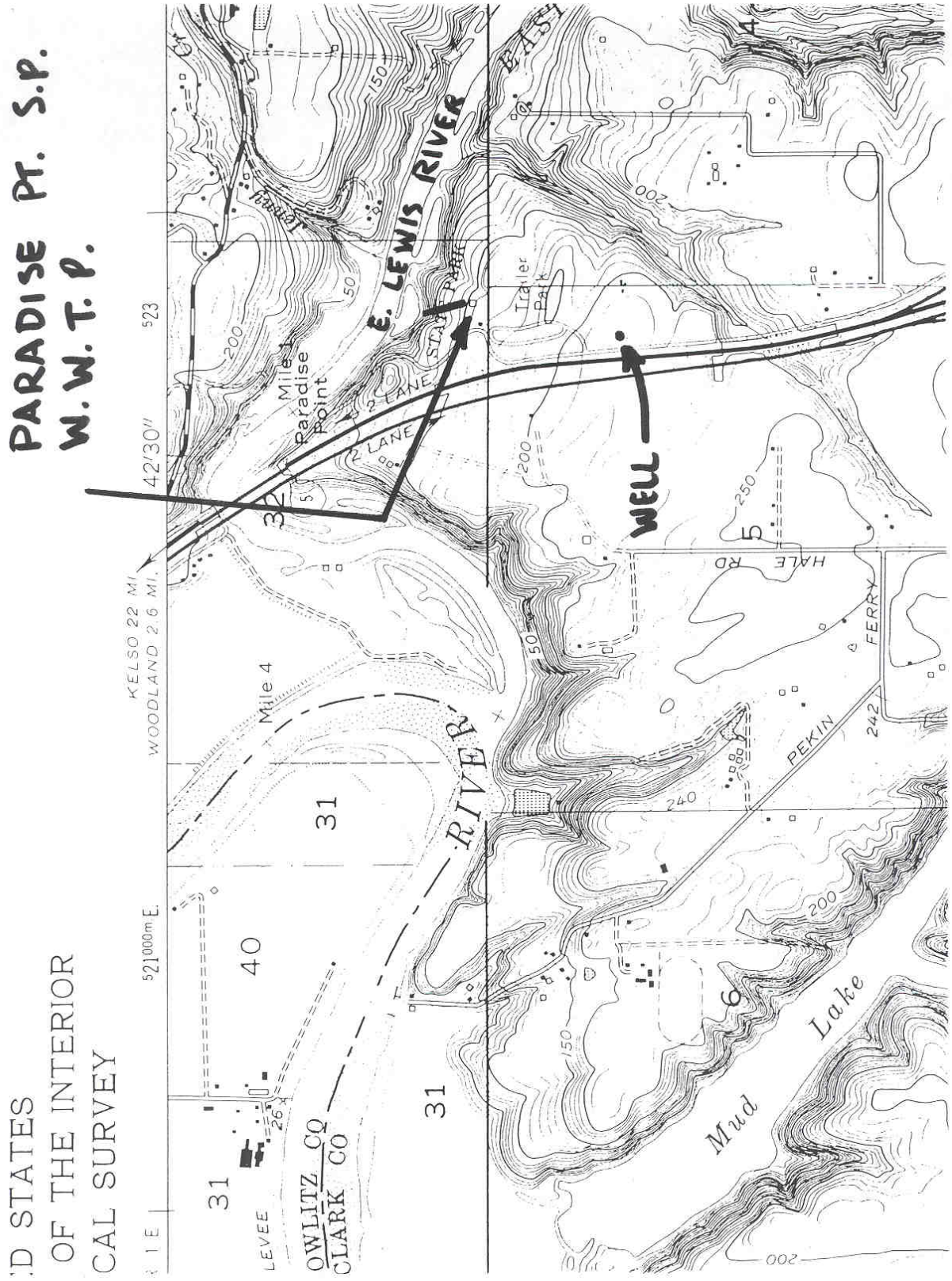
WLA Acute *ug/L*	WLA Chronic *ug/L*	LTA Acute *ug/L*	LTA Chronic *ug/L*	LTA Coeff. Var. (CV) *decimal*	LTA Prob'y Basis *decimal*	Limiting LTA *ug/L*	Coeff. Var. (CV) *decimal*	AML Prob'y Basis *decimal*	MDL Prob'y Basis *decimal*	# of Samples per Month *n*	
133164	74360.00	42756.70	39220.00	0.60	0.99	39220.0	0.60	0.95	0.99	4.00	1.00
380	726.00	122.0	382.9	0.60	0.99	122.0	0.60	0.95	0.99	4.00	1.00



Schematic
Sewage Disposal System
Paradise Point State Park


PARADISE POINT STATE PARK
SEWAGE LAGOON
AS BUILT
WASHINGTON STATE
PARKS AND RECREATION COMMISSION
C.H. Odegaard, Director
DRAWN BY R. L. Kerr
Const. 8/71
DATE April 22, 1971
SCALE as shown
DRAWING NO. 2
P150-32-2
PLAN VIEW
DISCHARGE DETAIL
No Scale
RETENTION TANK
No Scale
CHLORINATOR ENCLOSURE
No Scale
CLEAN-OUT MARKER
No Scale
COLLECTOR
No Scale
INLET DETAIL
No Scale
OVERFLOW
No Scale
NOT CONSTRUCTED


PARADISE POINT STATE PARK
SEWAGE LAGOON
"AS BUILT"
WASHINGTON STATE
PARKS AND RECREATION COMMISSION
SITE PLAN
SECTION A-A
CLEAN-OUT DETAIL
TRENCH DETAIL
PROFILE PIPE LINE
PROFILE OUTFALL LINE
T5N, R1EW.M.
SEC 32


PARADISE PT. S.P.
W.W.T.P.
WELL
E. LEWIS RIVER
Paradise Point
Mile 4
RIVER
Mud Lake
PEKIN FERRY
HALE RD
2 LANE
KELSO 22 MI.
WOODLAND 2.6 MI.
42'30"
523
521000m E.
OWLITZ CO
CLARK CO
LEVEE
Trailer Park
STATE PARK

APPENDIX D--RESPONSE TO COMMENTS

October 18, 2002, comments from Washington State Parks and Recreation on the Paradise Point State Park Permit and Responses from the Washington State Department of Ecology.

1. Comment:

The permit identifies monitoring of the effluent only from the date of the permit and lasting through November 30, 2005. Historically, the park only discharges two or three months separately during a calendar year, during a heavy flow event in the Lewis River. The permit language needs to somehow reflect that schedule. The monitoring language also needs to reflect when the first monitoring of the effluent should begin after the start of the applicable discharge.

Response:

The permit identifies an interim monitoring period from the beginning of the permit through April 30, 2004, and a final monitoring period lasting from May 1, 2004, through the expiration date of the permit. However, to remove confusion, the Department will add to the permit under S2.A. (Interim Monitoring Schedule) a footnote "c" that reads:

> [c]Because the facility only discharges during certain times of the year, monitoring of effluent will only be required when there is a discharge. When there are no discharges, a DMR must still be submitted with the words "no discharge" written in.

2. Comment:

Beginning on December 1, 2005, we will be required to monitor both influent and effluent. The effluent will only be monitored during the discharge, approximately two or three months in any given year. The monitoring schedule language needs to reflect when influent testing will be required in relation to the effluent. The language should also address the 85 percent removal rate in the months that we do not discharge.

Response:

The final limits already contains a footnote "b" under S1.A.2 that explains how 85 percent removal is calculated for the intermittent discharge. The Department will add another footnote to the final monitoring schedule that helps explain the intermittent discharge. The new footnote will be placed in S2.B and will read:

> [d]Because the facility only discharges during certain times of the year, monitoring of effluent will only be required when there is a discharge. Influent must continue to be monitored even if there is no discharge. When there are no effluent discharge, a DMR must still be submitted with the words "no discharge" written in. When the facility does discharge, percent removal shall be determined as a running average of the total mass of BOD/TSS discharge over the previous 12-month period versus the total mass loading of BOD/TSS in the influent.

3. Comment:

There are currently no funds available directly relating to the requirements of this permit. State Parks has already presented a 2003-05 budget proposal to our Commission for approval. A revision to that proposal will have to be made, and hopefully, it will be approved for the 2003-05 biennium. If funding is approved for the next biennium, the funds will not be theoretically available until after July 1, 2003. More realistically, the funds will be allotted in the fall of 2003. Therefore, we are requesting revisions to the permit report submittals requirement dates as follows:

A. Engineering Evaluation of Design Capacity and Plans for Maintaining Adequate Capacity—May 2004
B. Biosolids Removal Plan—May 2004
C. Engineering Plans & Specifications for a New Lagoon Liner—May 2004
D. Influent Meter & Sampling Station Plans & Specification –October, 2004
E. Influent Meter sampling Station Installation—May 2005
F. Influent & Effluent Meter Calibration Report—June 2005

Response:

All of the suggested dates were accepted and changed to fit with the reality of Parks having to submit a budget to the Legislature.

No other comments were received.